

A first Course in Linear Algebra

Exercise 1. RREF C17

$$\begin{aligned} -x_1 + 5x_2 &= -8 \\ -2x_1 + 5x_2 + 5x_3 + 2x_4 &= 9 \\ -3x_1 - x_2 + 3x_3 + x_4 &= 3 \\ 7x_1 + 6x_2 + 5x_3 + x_4 &= 30 \end{aligned}$$

SOLUCION:

We row-reduce the augmented matrix of the system of equations,

Reducimos por filas la matriz aumentada del sistema de ecuaciones,

$$\left(\begin{array}{ccccc|c} -1 & 5 & 0 & 0 & -8 \\ -2 & 5 & 5 & 2 & 9 \\ -3 & -1 & 3 & 1 & 3 \\ 7 & 6 & 5 & 1 & 30 \end{array} \right) \text{RREF} \mapsto \left(\begin{array}{ccccc|c} 1 & 0 & 0 & 0 & 3 \\ 0 & 1 & 0 & 0 & -1 \\ 0 & 0 & 1 & 0 & 2 \\ 0 & 0 & 0 & 1 & 5 \end{array} \right)$$

The reduced row-echelon form of the matrix is the augmented matrix of the system $x_1 = 3, x_2 = -1, x_3 = 2, x_4 = 5$, which has a unique solution. As a set of column vectors, the solution set is

la reduccion de la matriz de forma escalonada por filas es la matriz aumentada del sistema $x_1 = 3, x_2 = -1, x_3 = 2, x_4 = 5$, que tiene unica solucion. Como un conjunto de vectores de la columna, el conjunto solucion es

$$S = \left\{ \left(\begin{array}{c} 3 \\ -1 \\ 2 \\ 5 \end{array} \right) \right\}$$

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